APPENDIX 1

BIOLOGICAL MONITORING PLANS

TOWN OF EMERALD ISLE, NORTH CAROLINA
BOGUE INLET CHANNEL RELOCATION PROJECT

MACROINVERTEBRATE/INFAUNAL
PRE- AND POST-CONSTRUCTION MONITORING PROGRAM

Prepared For:
Town of Emerald Isle, North Carolina

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Wilmington, North Carolina

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1. PURPOSE AND GOALS: The following sampling and monitoring plan has been developed in support of an Environmental Impact Statement for the Bogue Inlet Channel Relocation Project. The monitoring and sampling plan is intended to address the need for baseline data collection and analysis of macroinvertebrate and infaunal species in the vicinity of the project area.

The monitoring and sampling plan will provide information on indigenous species in the proposed inlet channel on the intertidal shoal and along the intertidal habitat of the existing inlet. Infaunal sampling will also occur at the three permanent transect locations in the salt marshes. This plan is intended to support the concerns of the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, National Marine Fisheries Service, the North Carolina Department of Environment and Natural Resources, the North Carolina Division of Marine Fisheries, and the North Carolina Wildlife Resource Commission.

Sampling efforts are proposed to assess and document the potential effects of project activities on infaunal species in the intertidal areas of the inlet system and adjacent salt marsh environments. Sampling efforts will concentrate on the areas of potential direct and indirect impacts where biota and physical conditions are most likely to be affected by project activities.

2. MONITORING SCHEDULE: Monitoring of macroinvertebrate and infaunal species in the existing and proposed channels and salt marsh locations began April 2003 and will continue for one year prior to construction activities and for three years post-construction. Macroinvertebrate and infaunal sampling in the intertidal areas of the inlet and salt marsh system will be conducted on a seasonal basis during the months of April, July, October, and January. Infaunal sampling at the three salt marsh monitoring stations will assist in characterizing shoal versus marsh species.

Sampling will not occur during construction activities due to accessibility and safety issues, but will continue at each sampling station for two years post-construction.

The proposed project will be constructed between November 16th and March 31st to limit construction activities during the critical life stages of birds and fish, the turtle nesting and hatching season, the migratory passage of marine mammals, and the flowering stages of plants.

3. BIOLOGICAL MONITORING PARAMETERS:

3.1 MACROINVERTEBRATE/INFAUNAL SAMPLING

Six sampling stations are located along the existing channel (Stations 1-3) and adjacent to the new channel alignment (Stations 4-6). One sampling site (Station 7) is located in the intertidal habitat on the south side of Island No. 2. This sampling station will be used as a reference site for the infaunal samples. Three additional infaunal sampling stations are located in the salt marsh environment. Refer to Figure 1 for the infaunal monitoring stations located in the salt marshes, existing and proposed channels. Three replicate samples will be collected at all ten sampling stations. Replicate samples will be located close together (approximately one foot apart) without being located at the previous sampling site or where sediments appear to be disturbed. If appropriate sampling habitat (water less than 1.0 foot deep) is not available within 200 feet of the proposed sampling site during the low tide event, then a Ponar grab sampler will be used to obtain the sample.

Sampling parameters will include coquina clams (*Donax variabilis*), mole crabs (*Emerita talpoida*), penaeid shrimp (*Penaeus* sp.), and amphipod and polychaete indicator species.

3.1.1 Existing and Proposed Channel Monitoring Stations

Infaunal sampling will occur at three locations along the existing channel and proposed new channel alignment to provide a good representation of the macroinvertebrate and infaunal species common to the project area. Quantitative sampling of the macroinvertebrates and infaunal species along the existing and proposed channels will occur in the intertidal environments between mean high water and mean low water (approximate elevations between 2.29 and –1.59 National Geodetic Vertical Datum) at each sampling station.

All macroinvertebrate and infauna samples collected along the existing inlet, proposed inlet, and reference site will be collected approximately six inches above mean low water to ensure that all samples are collected from the same intertidal microhabitat. This will be accomplished through the use of predicted and observed tides, field measurements, survey techniques, copious note taking and/or a handheld GPS device (especially along the existing inlet) to ensure that the samples are collected at the same location and depth. All samples will be collected at or about peak low tide to ensure that the mean low water stage is more easily observed.

The three sampling stations along the existing channel will be located along the east side of the channel. The station locations have been chosen to reflect a representative sample of infaunal and macroinvertebrate species on the seaward side, bayside and center of the existing channel.

Quantitative sampling adjacent to the proposed inlet will include three sampling stations. Sampling stations will be located from the inner to the outer intertidal shoal area on either side of the proposed inlet. Refer to Figure 2 for the proposed sampling stations along the existing and proposed channels.